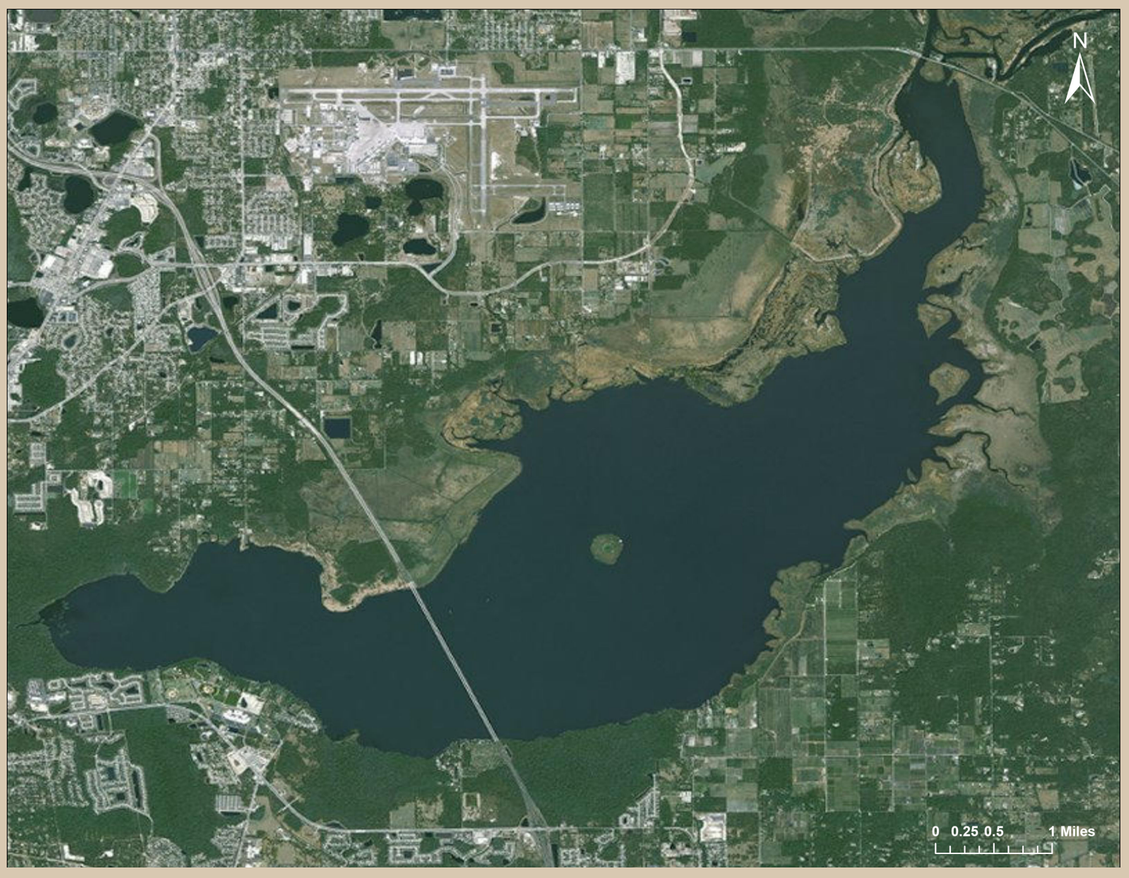
Innovative Algae Harvesting Technology to Combat Harmful Algal Blooms and Improve Water Quality

THE PROBLEM

Blue-green algae, or cyanobacteria, occur frequently in Florida's freshwater environments. Certain conditions, such as warm weather and increased nutrients, may cause the rapid growth of algae. A Harmful Algal Bloom (HAB) may produce toxins that can lead to health effects in both people and animals. HABs can threaten our environment and fragile ecosystems and can lead to the closure of recreational areas and economic losses in adjacent communities.

In 2019, the Florida Department of Environmental Protection (FDEP) Blue-Green Algae Task Force was formed to develop science-based recommendations to help combat blue-green algae in Florida. In 2020, FDEP awarded a grant to the St. Johns River Water Management District to test an innovative, mobile, algae harvesting technology to improve Lake Jesup by:

- Removing excess nutrients fueling HABs
- Removing HABs, algal toxins, and reducing turbidity caused by algae and other suspended solids



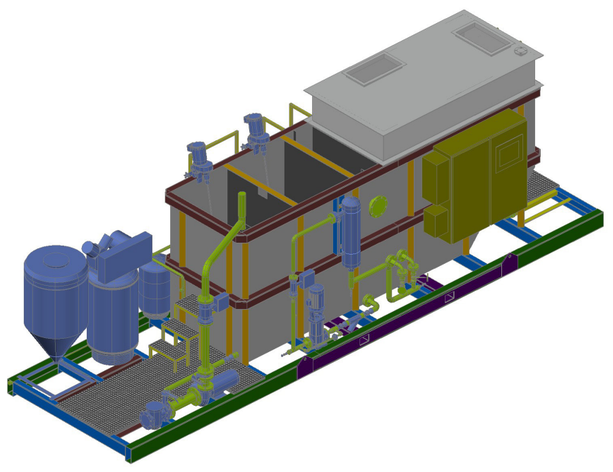
Lake Jesup

THE SOLUTION

An innovative, patent pending algae harvesting Hydronucleation Flotation Technology (HFT) developed by AECOM is being used for this research project to remove algae from Lake Jesup. AECOM's HFT has been proven in multiple field-based pilot studies to efficiently and safely harvest algae from water. By physically removing algae, the process also removes nutrients (phosphorus and nitrogen), along with algal toxins and carbon present in the cells.

HFT is designed to work with nature and takes advantage of the inherent characteristics of algae to sequester nutrients and carbon.

3-D Rendering of Algae Harvester



HOW IT WORKS

Algae-laden water is pumped from the surface of the lake to the HFT, where it is conditioned with an organic or drinking water treatment coagulant to clump the algae cells together to form larger particles. Microscopic air bubbles are then used to impart buoyancy on these larger particles, making them float to the surface of a treatment tank where they form a dense "skimmate" layer (float blanket) on the water. The float blanket is then skimmed from the water and crystal clear, clean clarified water is returned to Lake Jesup.

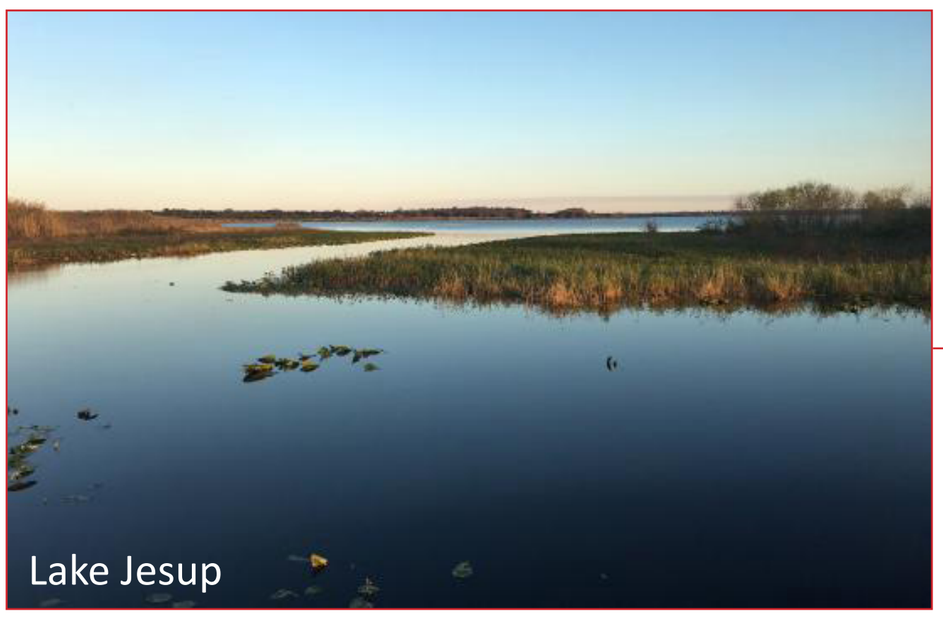
PROJECT BENEFITS

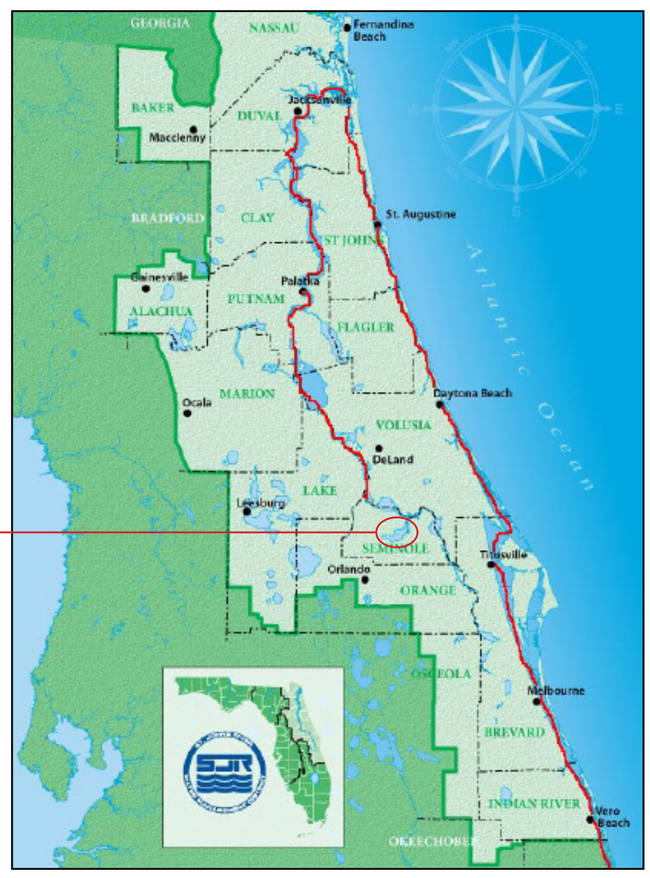
In 2008 the St Johns River was ranked sixth on the Most Endangered Rivers in the nation. The St Johns River connects with Lake Jesup, one of the most nutrient-enriched lakes within the district.

Two water bodies will benefit from this project:

- **Lake Jesup**
- **St Johns River**


St Johns River


Lake Jesup



BIOMASS MANAGEMENT

For this pilot demonstration, harvested algae biomass will be treated along with other biosolids at the Seminole County's Yankee Lake Wastewater Treatment Plant. Results from this pilot demonstration will be used to further our understanding of methods to convert algae biomass into a valuable feedstock for producing commercial products such as; algae biofuel, biofoam and biofertilizer to provide an innovative pathway to a more sustainable planet.

https://www.sjrwmd.com/projects/#lake-jesup